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The book has a distinct place, and ought to be very welcome, both as a work of reference and as a stimulus to further work in this important group of plants, which are so well represented in our own flora.

D. H. C.

MacDougal's Plant Physiology.[1] — Those who have had occasion to feel the lack of a clear, concise, and up-to-date text in plant physiology will welcome the appearance of any promising book on this subject. Dr. D. T. MacDougal, of the New York Botanical Garden, is the author of a work of this character.

Dr. MacDougal points out in his preface the increased recognition of irritability in its various manifestations, due chiefly to the work of Pfeffer, and makes this the cardinal point in his arrangement of the subject-matter. The first seven chapters are devoted to a consideration of this subject in its different phases. The study of these functions and properties, or the organism and its interaction with environmental conditions, is thus the first task of the student. The composition of the plant body, exchange and movements of liquids, metabolism, growth and reproduction, are taken up in the order named. To some this order of consideration may seem open to question on the ground that the student is plunged immediately into the thick of the most obscure of plant activities, where he can find little by way of physical or chemical foundation to lend him support.

In general, the treatment of the different phases of the subject of irritability is very satisfactory. One notes with pleasure that recent work has been incorporated. A sense of being in touch with the movement of the science is worth not a little as a stimulus to the student. This prompt acceptance, however, in an elementary text, of work that has not been thoroughly verified, unfortunately has its possible disadvantages. Occasionally, without criticising a given piece of work, one hesitates to accept the author's statement of results without a grain of salt. Explanations, even though plausible, may rightly fail to win unreserved adherence until more evidence is at hand. The work of Nemec on transmission of stimuli, Loew's explanation of the action of various classes of poisons, and (in another part of the book) Nathansohn's amitotic nuclear division under the circumstances reported, illustrate the principle just enunciated. In some cases, through oversight, minor errors have crept in. The strong mineral acids in normal solutions are by no means completely dissociated in all cases (p. 53). A "normal solution" as defined in botanical literature should conform to the chemical usage (p. 51). Unfortunately, in a number of instances botanists have failed to be thus exact in the use of terms, and confusion is likely to follow. These matters will doubtless correct themselves in later editions of the book under discussion.

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[1] MacDougal, D. T. *Practical Text-Book of Plant Physiology.* London, Longmans, Green & Co., 1891. 8vo, 352 pp., 159 figs.

The chapter dealing with the composition of the plant body, written by Mr. J. E. Kirkwood and Dr. W. J. Gies, introduces the beginner to the methods of detecting and estimating many of the more important substances that may be extracted from plants. This chapter will probably prove very useful, since it furnishes in clear, brief terms much information to which the student will be glad to refer often. The chapters dealing with the chemical changes taking place in the plant, with growth and with reproduction, call forth much by way of commendation.

In view of the fact that the book is intended to contain "details of experimental methods suitable for the exact analyses requisite in research work," it demands notice as a laboratory guide. The experiments are closely interwoven throughout the book with the discussion of the various phases of the subject which they illustrate. Generally speaking, the experiments are abundant and well chosen, and the directions for work are couched in clear terms. In the manner of arranging this matter, one might perhaps see some grounds for question. The juxtaposition of experiment to principle illustrated aids a possible shrewd guess on the part of the student occasionally, but the author has generally avoided undesirable suggestion in describing the experiments. Of course, this intermingling of discussion and experiment makes the book more difficult of use as a work of reference.

As a whole the illustrations are good, whether original or borrowed. An occasional exception may be noted (Fig. 134).

An appendix contains numerical data of use to the laboratory student. Tables for converting units of various kinds into those of other systems, densities of gases, expansion of air at different temperatures, and an abridgment of Pfeffer's table of osmotic values may be mentioned.

The book has so many excellencies that it is entitled to a wide use, and the occasional errors will be remedied as later editions call the author's attention more critically to his text. R. H. T.